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MEMORANDUM
RM-3660-ASDC
JUNE 1963

NAVY COST MODEL

A. J. Meltsner and H. R. Swaine

PREPARED FOR:
THE OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE/COMPTROLLER

The RAND Corporation
SANTA MONICA • CALIFORNIA

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PREFACE

This Memorandum presents the text of a briefing which was prepared for presentation to Department of Navy personnel. The Navy cost model effort described in the briefing is being performed for the Office of the Assistant Secretary of Defense (Comptroller), as part of a series covering each of the services. Special acknowledgement is due to D. Fisk, D. Strope, J. Surmeier and J. String for their help in preparing the materials for the briefing.

SUMMARY

The purpose of this briefing is to present a description of the preliminary work on a Navy cost model. This cost model is to be used for rapid cost estimating of alternative forces for use in cost-effectiveness studies and for projecting approximate budget levels.

In the initial development of this model, a determination was made as to the kinds of output the model should have. In general, these outputs are to be compatible with those of the OSD programming system. The model is structured to simulate Navy processes in a simplified manner, the structure being based on a study of the organization, policies, and procedures of the Navy. Finally, highly summarized statements of research projects are presented for the over-all model development work.

CONTENTS

A. ANALYSIS OF ALTERNATIVE FORCES

Our investigation of a Navy cost model stems from the extensive costing experience gained over a period of about ten years in estimating the costs of weapon systems and entire forces for the Air Force and from our experience during the last year in developing an automated Army cost model. While the Army, Navy, and Air Force differ in missions and institutional procedures, the basic problems of programming manpower, materiel, and facilities are common to all three services. In developing the Army cost model we have attempted to create a generalized cost model with sufficient flexibility to permit it to be adapted to other services without major structural modification.

Our cost modeling efforts aim at rapid cost estimating for planning studies and for projecting approximate budget levels. Frequent cost estimates of alternative forces are required for cost effectiveness studies. The budget implications of such alternative forces can be rapidly examined in a rough fashion without recourse to inputs from subordinate commands or specialized departments. Such a model can serve the budgeting operation as well, by providing generalized estimates to validate those developed for the budget year through a program manager's detailed consideration of requirements.

This report is designed to provide an understanding of the underlying philosophy and approaches of our preliminary work on a Navy cost model.

Our assessment of the cost implications of various weapon systems, equipage levels, deployments, and activity rates is not a simple aggregation process. Costs of weapon systems and entire forces are more interrelated than might at first appear, by virtue of the extensive interactions among systems in regard to manpower, materiel, and facilities. Realistic systems costing therefore involves integrated force structure costing. It involves detailed examination and often elaborate structuring of force interrelationships so that a change in one area will be reflected throughout the force.

A cost model such as we are discussing today is a useful device for compiling and utilizing data on the entire force. Such a modeling effort permits explicit facing up to service programming and costing problems in Program Element terms. Formulation of the model in these terms permits analysis of Program resource needs and the validation of Program Submissions of subordinate commands. Resource consistency among and within Programs is difficult when resource programming is fragmented. Are force changes reflected in resource areas such as personnel and materiel? Are changes in materiel reflected in operating costs? An automated cost model such as we are discussing today would assist the Department of the Navy in maintaining resource consistency between Navy Programs.

We also feel that eventually, through continued improvement in estimating relationships, it will be possible to compute Program Submissions with an automated cost model. Admittedly this can be achieved only through a long term effort and is contingent on an initial machine procedure which lends itself to modification and augmentation.

To illustrate some of the principal objectives of our cost model, let us go back for a moment to an earlier, cruder model which we developed last summer in anticipation of a requirement to cost sixteen different general purpose forces covering all of the Services. Here is a sample of nine of the Department of the Navy Elements considered as additions to the programmed force (A4). The second chart (A5) shows the additional Total Obligational Authority attributed to these forces for one year. The level of detail of resource information which was calculated is shown for one type of unit, the CVA's (A6). Manpower requirements and TOA, in appropriation and cost category terms, were estimated.

ALTERNATIVE FORCE STRUCTURES

1963

1964

1965

TABLE 1

INCREMENTAL FORCE STRUCTURES
(FORCE STRUCTURE UNITS ADDED)

PROGRAM ELEMENT	FORCE NUMBER							
	I	II	III	IV	V	VI	VII	VIII
Attack Carriers CVA	2	1			15			
Cruisers	3	2			20			
Frigates/DD	48	29	1	1	342	6	2	
Command Ships CLG	2	1			13	1		
Marine Divisions	1				5			10
Tank Battalions	1	1			10			29
Lt AA Missile Bn (Hawk)	1	1			8			16
Amphibian Tractor Bn	1	1			12			28
Heavy Rkt Btry (H.J.)	1	1			18			21

ALTERNATIVE FORCE STRUCTURES

1963

1964

1965

TABLE 2

TOTAL OBLIGATIONAL AUTHORITY REQUIREMENTS

(MILLIONS OF DOLLARS)

PROGRAM ELEMENT	FORCE NUMBER							
	I	II	III	IV	V	VI	VII	VIII
Attack Carriers CVA	825	415			6180			
Cruisers	215	185			1253			
Frigates/DD	2880	1740	72	72	21204	322	125	
Command Ships CLG	52	23			299	23		
Marine Divisions	176				880			1760
Tank Battalions	11	11			111			319
Lt AA Missile Bn (Hawk)	13	13			104			208
Amphibian Tractor Bn	8	8			96			224
Heavy Rkt Btry (H.J.)	1	1			108			126

ALTERNATIVE FORCE STRUCTURES

1963

1964

1965

TABLE 3

ATTACK CARRIERS CVA
T.O.A. REQUIREMENTS
(MILLIONS OF DOLLARS)

COST ELEMENT	FORCE NUMBER							
	I	II	III	IV	V	VI	VII	VIII
MILITARY PERSONNEL, TOTAL	5200	2600			39000			
Officers, Other (Navy)	200	100			1500			
Enlisted, Other (Navy)	5000	2500			37500			
INVESTMENT, TOTAL	800	400			6000			
Construction	0	0			0			
Procurement	800	400			6000			
OPERATIONS, TOTAL	25	15			180			
Procurement	*	*			10			
Military Personnel	16	8			90			
Operations & Maint.	9	7			80			
GRAND TOTAL	825	415			6180			

*Less than 500,000

B. MODEL OUTPUTS

TOTAL OBLIGATIONAL AUTHORITY AND MANPOWER OUTPUTS

To determine the kinds of outputs a Navy model should have, we have consulted with potential users - systems analysts who might use the results in their studies. In general, we have tried to come up with classifications close to those of the OSD programming system.

The next chart (B2) shows one of the many available outputs - this one in terms of TOA for each major Program. Paralleling it will be outputs showing manpower requirements. Results will also be available within each Program by functional aggregation, as in the examples for Programs II (B3) and III (B4). Estimates of TOA and personnel will be available by Program Element (B5) and Major Force Unit (B6). These are units which we think may be of significance in analyses. To give you an idea of the level of detail in which TOA and manpower outputs would be calculated, the next charts (B7-9) show sample lists of Major Force Units from Programs I, II, III, and IV.

The TOA information will be available for each Element by major appropriation (B10) and by cost category (B11-13). The cost category charts illustrate the maximum level of detail which will be available for any or all Elements.

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY PROGRAM

(MILLIONS OF DOLLARS)

	FISCAL YEAR					
	1963	1964	1965	1966	1967	1972
TOTAL: DEPT. OF THE NAVY						
STRATEGIC RETALIATORY FORCES						
CONTINENTAL AIR & MISSILE DEFENSE FORCES						
GENERAL PURPOSE FORCES						
AIRLIFT & SEALIFT						
RESERVE & GUARD FORCES						
RESEARCH & DEVELOPMENT						
GENERAL SUPPORT						

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY FUNCTIONAL AGGREGATION

(MILLIONS OF DOLLARS)

	FISCAL YEAR					
	1963	1964	1965	1966	1967	1972
TOTAL: PROGRAM II						
AIRCRAFT FORCES						
SURVEILLANCE AND WARNING SYSTEMS						
COMMAND CONTROL, COMMUNICATIONS, AND SUPPORT						

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY FUNCTIONAL AGGREGATION

(MILLIONS OF DOLLARS)

	FISCAL YEAR					
	1963	1964	1965	1966	1967	1972
TOTAL: PROGRAM III						
ATTACK CARRIER STRIKE FORCES						
SURVL. & OCEAN CONTROL FORCES						
MINE WARFARE FORCES						
AMPHIBIOUS ASSAULT FORCES						
MULTI-PURPOSE COMBAT FORCES						
SPECIAL COMBAT SUPPORT FORCES						
LOG. & OPN'L SUPPORT FORCES						
COMD., COMM., & COMD. SUPPORT						
RESERVE FLEET FORCES						
FLEET SUPPORT BASES						
MARINE DIVISION/WING TEAMS						

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY PROGRAM ELEMENT

(MILLIONS OF DOLLARS)

	FISCAL YEAR					
	1963	1964	1965	1966	1967	1972
TOTAL: SURVL. & OCEAN CONTROL						
ASW AIRCRAFT CARRIERS						
CARRIER ASW AIR GROUPS						
SUBMARINES						
ESCORT SHIPS						
SMALL PATROL SHIPS						
PATROL AIRCRAFT SQUADRONS						

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY MAJOR FORCE UNIT

(MILLIONS OF DOLLARS)

	FISCAL YEAR					
	1963	1964	1965	1966	1967	1972
TOTAL: OCEAN CONTROL SUBMARINES						
SS - SUBMARINES						
SSN - NUCLEAR POWER SUBMARINES						
AS - SUBMARINE TENDERS						
AGSS - AUXILIARY SUBMARINES						
ASR - SUBMARINE RESCUE SHIPS						
SUBMARINE BASES/OPN'L STAFFS						

SAMPLE MAJOR FORCE UNITS

PROGRAM I - STRATEGIC RETALIATORY FORCES

MISSILE FORCES, SEA BASED: SSBN - A-1 (A-1 MISSILE)
MISSILE FORCES, SEA BASED: SSBN - A-1 MOD (A-3 MISSILE)

MISSILE FORCES, SEA BASED: AK (FBM) - RESUPPLY SHIP
MISSILE FORCES, SEA BASED: AS (FBM) - SURMARINE TENDER
MISSILE FORCES, SEA BASED: ARDM (FBM) - FLOATING DRYDOCK
MISSILE FORCES, SEA BASED: OTHER FBM SUPPORT

MISSILE FORCES, SEA BASED: SSG - REGULUS, PRE '47
MISSILE FORCES, SEA BASED: SSG - REGULUS, POST '47
MISSILE FORCES, SEA BASED: SSGN - REGULUS, NUCLEAR

MISSILE FORCES, SEA BASED: REGULUS SUPPORT ACTIVITIES

PROGRAM II - CONTINENTAL AIR AND MISSILE DEFENSE FORCES

AIRCRAFT FORCES: F6A SKYRAY SQUADRONS

SURVL AND WARNING SYSTEMS: AIRBORNE DEW LINE EXTENSION

SURVL AND WARNING SYSTEMS: DER - RADAR PICKET ESCORT VESSEL, PATROL
SURVL AND WARNING SYSTEMS: AGR - RADAR PICKET SHIP
SURVL AND WARNING SYSTEMS: YR - FLOATING WORKSHOP

SURVL AND WARNING SYSTEMS: SPASUR

SURVL AND WARNING SYSTEMS: UNDERSEA SURVEILLANCE SYSTEMS

COMMAND CONTROL, COMMUNICATIONS AND SUPPORT

SAMPLE MAJOR FORCE UNITS (CONT.)

PROGRAM III - GENERAL PURPOSE FORCES

ATTACK CARRIER STRIKE FORCES: CVAN - ENTERPRISE
ATTACK CARRIER STRIKE FORCES: CVA - FORRESTAL CLASS
ATTACK CARRIER STRIKE FORCES: CVA - MIDWAY CLASS

CVG VF-FB SQDNS: F-4 PHANTOM II
CVG VF-FB SQDNS: F-8A/C CRUSADER
CVG VA-L SQDNS: A-4E SKYHAWK
CVG VA-M/Q SQDNS: A-5C VIGILANTE

OCEAN CONTROL: ASW AIRCRAFT CARRIERS

CVSG VS SQDNS: S-2A TRACKER

OCEAN CONTROL: SS - SUBMARINES
OCEAN CONTROL: SSN - NUCLEAR POWER SUBMARINES

OCEAN CONTROL: AS - SUBMARINE TENDERS
OCEAN CONTROL: AGSS - AUXILIARY SUBMARINES
OCEAN CONTROL: ASR - SUBMARINE RESCUE SHIPS
OCEAN CONTROL: SUBMARINE BASES/OPERATIONAL STAFFS

OCEAN CONTROL: DE (WW II) DESTROYER ESCORTS
OCEAN CONTROL: DE (POST WW II) DESTROYER ESCORTS
OCEAN CONTROL: DEG - GUIDED MISSILE ESCORTS
OCEAN CONTROL: PGM - MOTOR GUNBOATS

MINE WARFARE: MSO - MINESWEEPERS, OCEAN
MINE WARFARE: MSC - MINESWEEPERS, COASTAL
MINE WARFARE: ADG - DEGAUSSING SHIPS

MULTI-PURPOSE COMBAT: CAG - GUIDED MISSILE HEAVY CRUISERS
MULTI-PURPOSE COMBAT: CLG - GUIDED MISSILE LIGHT CRUISERS (TALOS)
MULTI-PURPOSE COMBAT: CLG - GUIDED MISSILE LIGHT CRUISERS (TERRIER)
MULTI-PURPOSE COMBAT: DD - DESTROYERS (PRE '47)
MULTI-PURPOSE COMBAT: DD - DESTROYERS (931/945 CLASS)
MULTI-PURPOSE COMBAT: DDG - GUIDED MISSILE DESTROYERS
MULTI-PURPOSE COMBAT: AD - DESTROYER TENDERS

SAMPLE MAJOR FORCE UNITS (CONT.)

PROGRAM III - GENERAL PURPOSE FORCES (CONTINUED)

MARINE CORPS DIVISIONS

MARINE CORPS: TANK BATTALIONS
MARINE CORPS: LIGHT ANTI-AIRCRAFT MISSILE BN (HAWK)
MARINE CORPS: AMPHIBIAN TRACTOR BATTALIONS
MARINE CORPS: OTHER COMBAT SUPPORT FORCES

MARINE AIR WING: VF-FB SQDNS F-4 PHANTOM II
MARINE AIR WING: VF-FB SQDNS F-8 CRUSADER
MARINE AIR WING: VA-L/M SQDNS A-4/A-6 SKYHAWK/INTRUDER
MARINE AIR WING: HH SQDNS CH-37
MARINE AIR WING: VR/VG SQDNS C-130 HERCULES

MARINE AIR WING: HEADQUARTERS SQDNS, SERVICE UNITS

HEADQUARTERS FLEET MARINE FORCES

PROGRAM IV - AIRLIFT AND SEALIFT FORCES

AIRLIFT INDUSTRIAL FUND: NAVY PERSONNEL ASSIGNED TO MATS

SEALIFT: TROOP TRANSPORT - MILITARY MANNED
SEALIFT: TROOP TRANSPORTS - CIVIL SERVICE MANNED

SEALIFT: VEHICLE CARGO SHIPS
SEALIFT: OTHER CARGO SHIPS, GENERAL PURPOSE
SEALIFT: OTHER CARGO SHIPS, SPECIAL PURPOSE
SEALIFT: TANKERS
SEALIFT: PROJECT SHIPS

SEALIFT: COMMERCIAL PASSENGER & CARGO MOVEMENTS

NAVY AIR CARGO & PORT TERMINALS

SEALIFT: HEADQUARTERS AND COMMAND SUPPORT

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY APPROPRIATION CATEGORY

(MILLIONS OF DOLLARS)

APPROPRIATION CATEGORY	FISCAL YEAR				
	1963	1964	1965	1966	1972
TOTAL: DEPT. OF THE NAVY					
MILITARY PERSONNEL, NAVY					
MILITARY PERSONNEL, MARINE CORPS					
RESERVE PERSONNEL, NAVY					
RESERVE PERSONNEL, MARINE CORPS					
MILITARY CONSTRUCTION, NAVY					
MILITARY CONSTRUCTION, NAVAL RESERVE					
OPERATIONS & MAINTENANCE, NAVY					
OPERATIONS & MAINTENANCE, MARINE CORPS					
SHIPBUILDING & CONVERSION, NAVY					
OTHER PROCUREMENT, NAVY					
PROCUREMENT OF AIRCRAFT & MISSILES, NAVY					
PROCUREMENT, MARINE CORPS					
R. D. T. & E., NAVY					

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY COST CATEGORY*

(MILLIONS OF DOLLARS)

COST CATEGORY	FISCAL YEAR				
	1963	1964	1965	1966	1972
COST CATEGORY SUMMARY					
TOTAL T.O.A.					
RESEARCH & DEVELOPMENT					
INVESTMENT					
OPERATIONS					
COST CATEGORY DETAIL					
RESEARCH & DEVELOPMENT, TOTAL					
R.D.T.& E., Navy					
Military Construction, Navy					
INVESTMENT, TOTAL					
Construction					
Military Construction, Navy					
Military Construction, Naval Reserve					
Procurement					
P.A.M.N.					
Aircraft & Related Equipment					
Missiles, Drones, & Related Equip.					
Shipbuilding & Conversion, Navy					
Other Procurement, Navy					
Procurement, Marine Corps					
Operations & Maintenance, Navy (FRAM)					

*FORMATS BY: a - TOTAL NAVY
b - PROGRAM
c - FUNCTIONAL AGGREGATION
d - PROGRAM ELEMENT
e - MAJOR FORCE UNIT

DEPARTMENT OF THE NAVY

TOTAL OBLIGATIONAL AUTHORITY BY COST CATEGORY (CONT.)

(MILLIONS OF DOLLARS)

COST CATEGORY	FISCAL YEAR				
	1963	1964	1965	1966	1972
COST CATEGORY DETAIL (CONT.)					
INVESTMENT (CONT.)					
Training, Total Initial					
Military Personnel, Navy					
Military Personnel, Marine Corps					
Military Construction, Navy					
Operations & Maintenance, Navy					
Operations & Maintenance, Marine					
Other Procurement, Navy					
P.A.M.N.					
Aircraft & Related Equipment					
Missiles, Drones, & Related Equip.					
Procurement, Marine Corps					
OPERATIONS, TOTAL					
Operations & Maintenance					
Operations & Maintenance, Navy					
General Expenses, Navy					
Weapons & Facilities					
Ships & Facilities					
Medical Care					
Civil Engineering					
Service Wide Supply					
Service Wide Operations					
Naval Petroleum Reserves					
Military Family Housing					
Operations & Maintenance, Marine Corps					

TOTAL OBLIGATIONAL AUTHORITY BY COST CATEGORY (CONT.)

(MILLIONS OF DOLLARS)

COST CATEGORY	FISCAL YEAR				
	1963	1964	1965	1966	1972
COST CATEGORY DETAIL (CONT.)					
OPERATIONS (CONT.)					
Procurement					
P.A.M.N.					
Aircraft & Related Equipment					
Missiles, Drones, & Related Equip.					
Shipbuilding & Conversion, Navy					
Other Procurement, Navy					
Procurement, Marine Corps					
Military Personnel					
Military Personnel, Navy					
Reserve Personnel, Navy					
Military Personnel, Marine Corps					
Reserve Personnel, Marine Corps					
Training, Total Annual					
Military Personnel, Navy					
Military Personnel, Marine Corps					
Military Construction, Navy					
Operations & Maintenance, Navy					
Operations & Maintenance, Marine Corps					
Other Procurement, Navy					
P.A.M.N.					
Aircraft & Related Equipment					
Missiles, Drones & Related Equip.					
Procurement, Marine Corps					

MATERIEL ANNEX OUTPUTS

For major items, we will also have information similar to that in the Materiel Annex (B15). Quantities and dollars will be shown both for the year of funding (Program Year) and for the years of required delivery to the force. This information will be estimated for the total Navy, each Program, and each Major Force Unit. The same information will be estimated for the Marine Corps. We are currently planning to calculate such information for 134 equipment and ammunition items which together account for about 75% of Navy and Marine Corps procurement (B16-19). This is divided as follows:

Appropriation	No. of Items	% of Appropriation
Procurement of Aircraft and Missiles, Navy	42	75%
Shipbuilding and Conversion, Navy	57	100%
Other Procurement, Navy	20	30%
Procurement, Marine Corps	15	45%
Total Items	134	

DEPARTMENT OF THE NAVY

MATERIEL ANNEX

QUANTITIES AND DOLLARS - TOTAL OBLIGATIONAL AUTHORITY AND DELIVERIES*

MATERIEL ITEM		1963	1964	1965	1966	1972
AK (FBM) Resupply Ship	TOA (mil $)	20.0	.0	20.0	.0	.0
	Qty (units)	1	0	1	0	0
	Del (mil $)	.0	20.0	.0	20.0	.0
	Qty (units)	0	1	0	1	0
AO Jumbo Oiler	TOA (mil $)	25.0	25.0	25.0	.0	25.0
	Qty (units)	1	1	1	0	1
	Del (mil $)	.0	.0	25.0	50.0	25.0
	Qty (units)	0	0	1	2	1
Cartridge 105mm HE M442	TOA (mil $)	5.0	5.0	.0	.0	.0
	Qty (units)	9000	9000	0	0	0
	Del (mil $)	2.5	5.0	5.0	2.5	.0
	Qty (units)	4500	9000	9000	4500	0
Materiel Annex Total	TOA (mil $)	9052.3	9983.3	9001.0	8826.1	6683.4
	Del (mil $)	8823.7	8742.9	8844.4	9011.4	6888.2

*FORMATS BY: a- TOTAL NAVY
b- MAJOR FORCE UNIT

SELECTED MAJOR ITEM LIST
(based on Navy Materiel Annex of 2 January 1963)

I. PAMN

AIRCRAFT

A-4E (A4D-5)

A-5C (A3J-3)

A-6A (A2F-1)

C-2A/COD (W2F/COD)

C-4B (VRM)

C-130E/F (GV-1U/2U)

CH-46A (HRB-1)

CH-53A (HHX)

E-2A (W2F-1)

EA-6A (A2F-1H)

F-4B (F4H-1)

F-8E (F8U-2NE)

F-111B (TFX)

P-3A (P3V-1)

RF-4B (RFH-1)

S-2E (S2F-3/3S)

SH-3A (HSS-2)

T-2B (T2J-2)

T-39A (T3J-1)

T-39D (T3J-1)

TC-4B (VRMX)

U-3

U-8F (L23-F)

UH-1E (HU-1E)

UH-2A (HU2K-1)

MISSILES

AAM, L.R. Phoenix

BULLPUP 7 A/B

BULLPUP 7T (T-GAM)

POLARIS A-2

POLARIS A-3

SHRIKE 10

SIDEWINDER 1C IRAH

SIDEWINDER 1C SARAH

SELECTED MAJOR ITEM LIST
(based on Navy Materiel Annex of 2 January 1963)

I.	MISSILES (Contd)	AGC
	SPARROW III 6/6A/6B	AGH/AGHR
	SUBROC	AGM-PMR
	TALOS 6C1	AGMR
	TARTAR	AGOR
	TERRIER BT-3/3A/HT-3	AGS
	DRONES	AGSL
	ASW DRONE HELICOPTER, QH-50C	AGSS (R&D)
	KD2B-1	AGTR
	KD2R-5	AKL
	Q2C	AK (FBM)
II.	SCN	AO
	AD	AOE
	AE	AORL
	AE (FAST)	APSS
	AFS	ARD
	AG (RDT&E)	ARDM
	AGB	ARS/ARSD

SELECTED MAJOR ITEM LIST
(based on Navy materiel Annex of 2 January 1963)

II. SCN (Contd)

- AS
- AS (FBM)
- ASR
- ATA
- ATF
- ATS
- AVB
- AVM
- CC
- CVA (FY 1963 & Later Class)
- CVS
- DD-710 Class (FRAM)
- DDG (From DD-931 Class)
- DDG (From DL)
- DE
- DE (SEA HAWK)
- DEG
- DLG
- DLG (TYPHON)
- DLGN (TYPHON)
- LPD
- LPH
- LSD
- LST
- MCS
- MHC
- MSO
- PGM
- SS (GUPPY III)
- SSBN
- SSN
- T-LSV (RO/RO)
- SERVICE & LANDING CRAFT

III. OPN

- AN/SPS-48
- AN/SSA-11
- AN/SSQ-23

SELECTED MAJOR ITEM LIST
(based on Navy Materiel Annex of 2 January 1963)

III. OPN (Contd)

AN/SSQ-28

CAESAR

NTDS

OPCON CENTERS

SSQ-15/RANGE

AMMUNITION

ASROC MISSILE (Less Payload)

DISP & BOMB CBU1A (SADEYE)

MINE MK 52

MINE MK 55

MINE MK 56

MINE MK 57

ROCKEYE

TORPEDO MK 37 MODS 0, 1

TORPEDO MK 44 MODS

TORPEDO MK 45 (ASTOR)

TORPEDO MK 46

ZUNI ROCKETS

IV. PMC

AN/PRC-38

AN/TPS-32

AN/TYQ-1, TACC

AN/TYQ-2, TAOC

RIFLE, 7.62mm M14

MISSILES

HAWK MISSILE

REDEYE MISSILE

AMMUNITION - Related Materiel Items

CTG 7.62mm ALL TYPES/BLANK/M80 Clip

CTG 105mm HE M442A1/XM482

CTG 105mm T378/XM400/M444

OTHER ITEMS - Using Weapons

GUN MACHINE 7.62mm M60

GUN MACHINE 7.62mm M73

HOWITZER 105mm Towed M2

LVTH-6

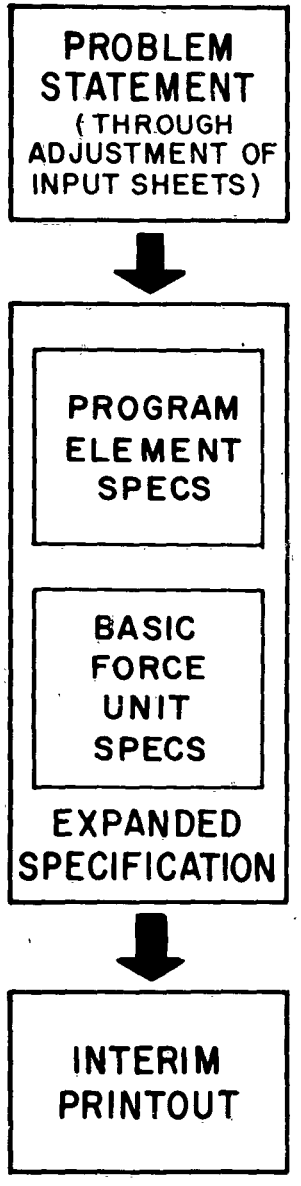
MODEL STRUCTURE: EXPANDED SPECIFICATION

Based on a study of the organization, policies, and procedures of the Navy, we have structured a cost model which simulates Navy processes in a simplified manner. The structure of the cost model will be described in four generalized charts to follow (C2, C8, C13, C18). First, however, let us consider for a moment how problems are presented to the cost model. If, every time a problem were stated, our analysts had to fill in all of the input information, rapid answers would not be feasible. Fortunately, in most problems we need to adjust only a small number of items, such as the numbers of specific kinds of ships and/or aircraft. Similarly, changes in detailed specifications, relationships, and cost factors, as they become known, can be effected simply.

Our first task in the model, after the problem has been stated, is to specify in sufficient detail the force which is to be costed (C2). We do this in a two-step expansion process. The first input sheet translates the Major Force Unit into component units, termed Basic Force Units (C3). The second input sheet (C4) illustrates how the Basic Force Units have their personnel and equipment specified. Thus each Program Element (or Major Force Unit) in each Program has its equipment and manning specified.

Our current plans call for 264 Major Force Units and 245 Basic Force Units. An idea of the level of detail and scope of the basic units can be seen in the sample Basic Force Unit lists (C5, C6).

MODEL STRUCTURE



I

MAJOR FORCE UNIT DATA

I -C3-

MAJOR FORCE UNIT NUMBER 1301 0 (ALL CARDS) MISSION/AREA F (ALL CARDS) RUN NUMBER 000000 (ALL CARDS)

FISCAL YEAR: N = 1963

	CODE	FORMAT	
TITLE	00001	F	MULTI-PURPOSE COMBAT - CGN - NUC POWER GUIDED MSL CRUISERS
SEC. DEF. NO	00011	B	3.20.05.01.2

FORCE STRUCTURE	CODE	FORMAT		N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
	00013	J	CGN - MSL CRUISERS NUC	1					2		3				
	00029	J													
	00045	J													

FISCAL YEAR

COMMENTS	CODE	FORMAT	
	00157	F	
	00167	F	
	00177	F	

FISCAL YEAR

	CODE	FORMAT	N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
CGN-TAL@S/TERRIER (NEW)	20250	2	1											
CGN-TYPHON (NEW)	20350	2						1	0	2				
CGN-TYPHON (CONV. FROM TAL@S/TERRIER)	20360	2							1					

ADJUSTMENT FACTORS	CODE	FORMAT
OFFICER	00061	1
ENLISTED	00073	1
CIVILIAN	00085	1
EQUIPMENT	00097	1
RELATED EQUIPMENT	00109	1
ATTRITION / CONSUMPTION	00121	1
TRAINING CONSUMPTION	00133	1
	00145	1
	00187	1

II

BASIC FORCE UNIT DATA

II

-C4-

BASIC FORCE UNIT NUMBER 2250 (ALL CARDS) MISSION/AREA F (ALL CARDS) RUN NUMBER 00000 (ALL CARDS)

PAGE 1 OF 1

FISCAL YEAR: N= 1963

	CODE	FORMAT	
TITLE	00001	F	CGN - TALOS/TERRIER (NEW)
COMMENTS	00157	F	
	00167	F	
	00177	F	

			FISCAL YEAR										
			N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
OFFICER - OTHER (NAVY)	41040	2	75											
ENLISTED - OTHER (NAVY)	42040	2	700											
OFFICER - OTHER (MARINE CORPS)	44050	2	3											
ENLISTED - OTHER (MARINE CORPS)	45050	2	30											
SHIP - CGN - TALOS/TERRIER (NEW)	31137	2	1											
ASROC MISSILE (LESS PAYLOAD)	31201	2	25											
NTDS	31209	2	1											
TALOS MISSILE 6C-1	31212	2	50											
TERRIER MISSILE BT-3/3A	31215	2	50											
TERRIER MISSILE HT-3	31219	2	50											
TORPEDO MK 44 MODS/MK 46	30232	2	25											
RIFLE 7.62 MM M 14	30235	2	30											
ADJUSTMENT FACTORS: OFFICER	00061	1												
ENLISTED	00073	1												
CIVILIAN	00085	1												
EQUIPMENT	00097	1												
	00109	1												
	00121	1												

SAMPLE BASIC FORCE UNITS

I. SELECTED BASIC FORCE UNITS - SHIPS

AD - Destroyer Tender

AE - Ammunition Ship

AF - Store Ship

AGC - Amphibious Force Flagship

AK (FBM) - Resupply Ship

AO - Oiler

AS (FBM) - Submarine Tender

AVB - Advanced Aviation Base Ship

CG-- Guided Missile Cruiser
CGN - Guided Missile Cruiser, Nuclear

CLG - Guided Missile Light Cruiser (TALOS)
CLG - Guided Missile Light Cruiser (TERRIER)

CVA - FY 61/later
CVA - Forrestal Class
CVA - Kitty Hawk Class
CVA - Midway Class
CVA - Essex/Hancock Class
CVAN - Enterprise Class

DD - Destroyer (Pre-'47, without FRAM)
DD - Destroyer (Pre-'47, with FRAM I)
DD - Destroyer (Pre-'47, with FRAM II)
DD - Destroyer (931/945 Class)

DE - Destroyer Escort (WW II)
DE - Destroyer Escort (Post WW II, without improvements)
DE - Destroyer Escort (Post WW II, with improvements)

DEG - Guided Missile Escort Ship

DL - Frigate (without DASH)
DL - Frigate (with DASH)

DLG - Guided Missile Frigate, Class 6
DLG - Guided Missile Frigate, Class 16
DLG - Guided Missile Frigate, Class 26
DLGN - Guided Missile Frigate, Nuclear

LPH - Amphibious Assault Ship (New)
LPH - Amphibious Assault Ship (Conversion)

MCS - Mine Countermeasures Support Ship
MCS - (LSD Type)
MCS - (LST Type)

SSG - Regulus, Pre-'47
SSG - Regulus, Post -'47
SSGN - Regulus, Nuclear

SSN - Submarine, Nuclear, Pre-Thresher Class
SSN - Submarine, Nuclear, Thresher Class

II. SELECTED BASIC FORCE UNITS - NAVY AIRCRAFT

HS Squadron SH-3A Choctaw

SAMPLE BASIC FORCE UNITS (Contd)

HS Squadron SH - 34J Choctaw

VA-H/RECCO Squadron A-3B Skywarrior
VA-H/RECCO Squadron A-5A/B Vigilante
VA-H/RECCO Squadron A-5C Vigilante

VA-L Squadron A-4B/C Skyhawk
VA-L Squadron A-4E Skyhawk
VA-L Squadron AF-1E Fury

VA-M/Q Squadron A-1 Skyraider
VA-M/Q Squadron A-6A Intruder
VA-M/Q Squadron EA-6A Intruder

VA-P Squadron RA-3 Skywarrior
VA-P Squadron T-33 Shooting Star

VF-FB Squadron F-3 Demon
VF-FB Squadron F-4 Phantom II
VF-FB Squadron F-6 Skyray
VF-FB Squadron F-8A/C Crusader
VF-FB Squadron F-8D/E Crusader

VF-P Squadron RF-8A Crusader

VP-L Patrol Squadron P-3 Orion
VP-L Patrol Squadron SP-2H Neptune
VP-L Patrol Squadron SP-2E Neptune
VP-L Replacement Squadron

VP-S Patrol Squadron SP-5A Marlin
VP-S Patrol Squadron SP-5B Marlin
VP-S Replacement Squadron SP-5B Marlin

VS Squadron S-2A Tracker
VS Squadron S-2B Tracker
VS Squadron S-2D/E Tracker

VT/VR Squadron C-47 H/J
VT/VR Squadron T-28B
VT/VR Squadron T-39D Sabreliner
VT/VR Squadron TA-3B Skywarrior
VT/VR Squadron TF-9J Cougar
VT/VR Squadron TF-10B Skynight

VW-M/VQ Squadron E-1 Tracer
VW-M/VQ Squadron E-2 Hawkeye
VW-M/VQ Squadron EA-1 Skyraider
VW-M/VQ Squadron EC-1 Trader
VW-M/VQ Squadron T-33 Shooting Star

III. SELECTED BASIC FORCE UNITS - OTHER

Aviation Support Base Stations

Operational Control Centers

SPASUR - Space Survl. Sys.

IV. SELECTED BASIC FORCE UNITS - MARINE CORPS

Amphibian Tractor Battalion

Headquarters Fleet Marine Forces

Heavy Artillery Rocket Battery (HONEST JOHN)

Light Anti-Aircraft Missile Battalion (HAWK)
Light Anti-Aircraft Missile Battalion (HAWK), Cadre Strength

Marine Corps Division

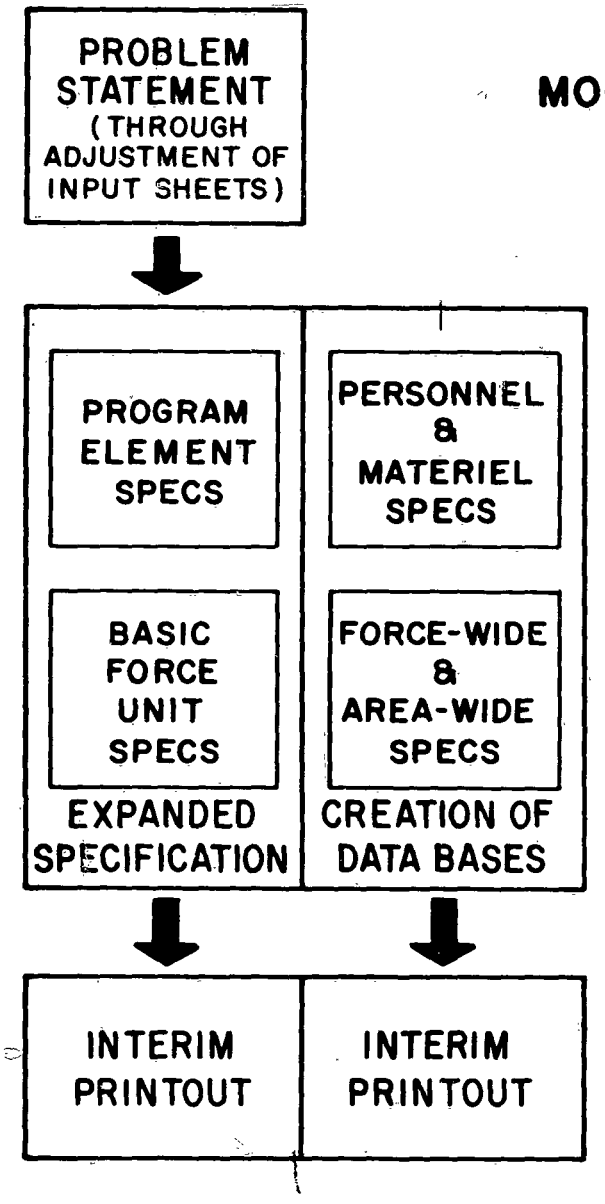
Tank Battalion 90mm Guns
Tank Battalion 90/120mm Guns

MODEL STRUCTURE: CREATION OF DATA BASES

After the expanded specification, the next task is the creation of the data base - the complete statement of what is to be priced (C8). First, in this materiel phasing sheet (C9) we deal with the timing of the introduction of specific items of equipment, given initial allowances in terms of the selected items. The next chart (C10) contains inputs to indicate consumption rates and similar data for calculating materiel flows and stocks. This input sheet III B (C10) can also be used to enter activity rate information related to each materiel item. For example, steaming hours per ship and overhaul rates per steaming hour would be entered on this sheet. Similarly, flying hours per aircraft and maintenance activities per flying hour would be entered here. Alternatively, ship overhaul costs can be entered on a ship-year basis. These factors can be differentiated by mission and can be time-phased. "Related Equipment" in our model is essentially ammunition, which we treat as a function of the using equipment.

It is at this stage that the model is concerned with determining the net requirements for assets. Force units which have surpluses of equipment or trained personnel are noted and these surpluses are taken into account in determining the required purchases for investment or operating needs of other units.

MODEL STRUCTURE



III A

MATERIEL PHASING SCHEDULE

III A

GENERIC TYPE NUMBER 3232 (ALL CARDS)

RUN NUMBER 000000 (ALL CARDS)

PAGE 1 OF 1

FISCAL YEAR: N= 1963

GENERIC NAME: TORPEDO MK 44 MODS/MK 46

MISSION / AREA NAME	MODEL NAME	MISSION/AREA CODE	FORMAT	N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
				FISCAL YEAR											
WORLD WIDE	TORPEDO MK 46	32332	5			02000	06000	10000							
	TORPEDO MK 44 MODS	32232	5	10000	10000	08000	04000	00000							

MATERIEL DATA

MATERIEL NUMBER 31219 (ALL CARDS) MISSION/AREA F (ALL CARDS) RUN NUMBER 000000 (ALL CARDS)

FISCAL YEAR: N= 1963

MATERIEL NAME	CODE	FORMAT	
	00001	F	TERRIER MISSILE HT-3

YEARLY DATA	CODE	FORMAT	N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
UNSPECIFIED UNITS EQUIPMENT ALLOWANCE FACTOR	00023	5												
ATTRITION / CONSUMPTION RATE (/YEAR)	00039	5	01300	00600					01300					

NO-YEAR DATA	CODE	FORMAT	
COMBAT SUPPORT RATE	00037	5	15000
PIPELINE COEFFICIENT	00038	S	

AMMUNITION DATA

AMMUNITION NAME	DATA	CODE	FORMAT	N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
	COMBAT SUPPORT RATE (/DAY)	33 0	6												
	TRAINING CONSUMPTION RATE (/YEAR)	33 1	2												
	COMBAT SUPPORT RATE (/DAY)	33 0	6												
	TRAINING CONSUMPTION RATE (/YEAR)	33 1	2												
	COMBAT SUPPORT RATE (/DAY)	33 0	6												
	TRAINING CONSUMPTION RATE (/YEAR)	33 1	2												
	COMBAT SUPPORT RATE (/DAY)	33 0	6												
	TRAINING CONSUMPTION RATE (/YEAR)	33 1	2												
	COMBAT SUPPORT RATE (/DAY)	33 0	6												
	TRAINING CONSUMPTION RATE (/YEAR)	33 1	2												

OTHER RELATED EQUIPMENT DATA	CODE
	3
	3
	3
	3
	3
	3
	3
	3
	3
	3

MODEL STRUCTURE: UNSPECIFIED UNIT PERSONNEL

Personnel assigned to units which have not been delineated on input sheets I and II (C3, C4) are accounted for on input sheet III E (C12). This input sheet is used to enter information about the manning of combat support and other unspecified force units. Ratios are entered by mission/area, by year, and by personnel type in order to factor in the manning of the unspecified units as a percentage of the personnel of the specified units.

III E

UNSPECIFIED UNIT PERSONNEL ALLOCATION SCHEDULE

III E

-C12-

TOTAL MILITARY PERSONNEL 40000 ALL CARDS

RUN NUMBER ALL CARDS

PAGE 1 OF 1

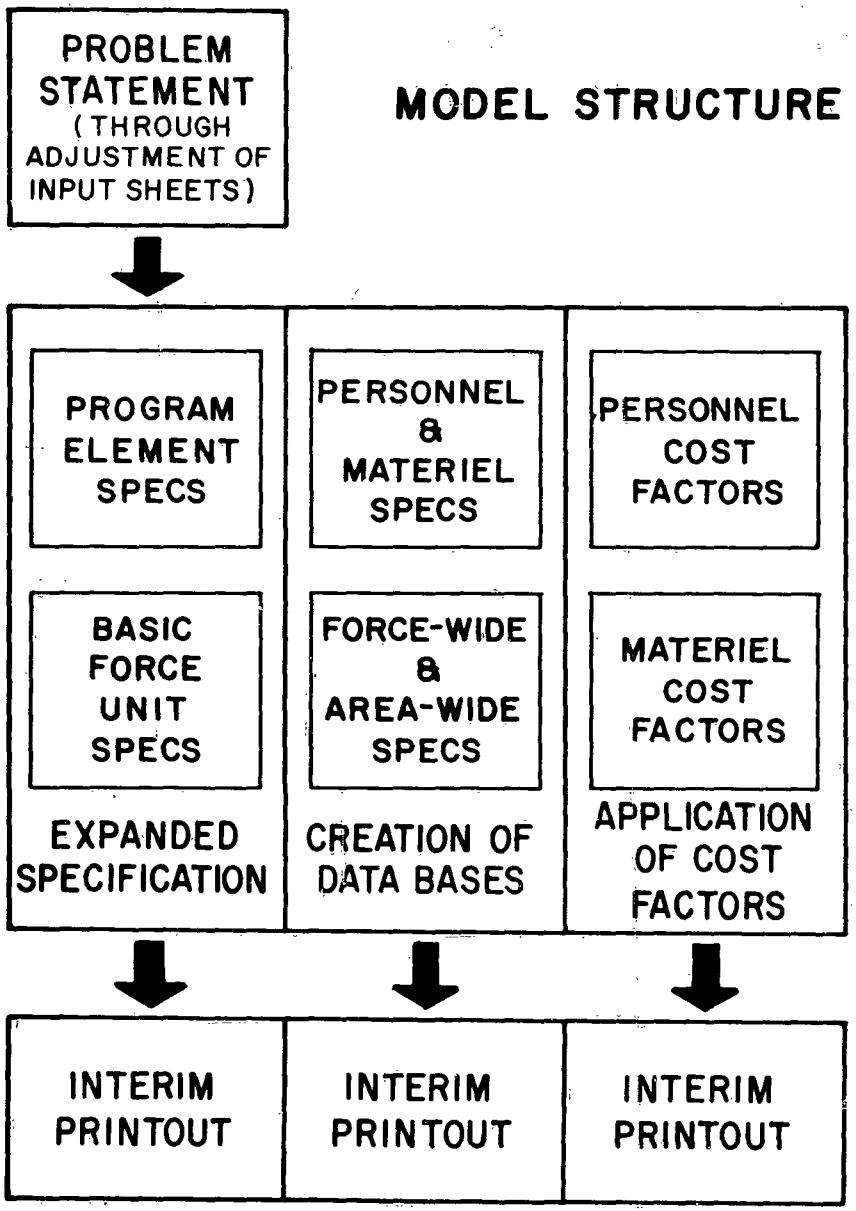
FISCAL YEAR: N= 1963

MISSION/ AREA NAME	PERSONNEL TYPE NAME	MISSION/AREA	CODE	FORMAT	FISCAL YEAR N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
				5												
				5												
				5												
				5												

MODEL STRUCTURE: APPLICATION OF COST FACTORS

Having calculated what we need in physical terms, we may now proceed to translate it into dollars by applying cost factors (C14). Equipment costs are entered on the next chart (C15). Certain personnel cost factors are entered on the next chart (C16).

MODEL STRUCTURE



MATERIEL COST DATA

MATERIEL NUMBER 3/2/9 (ALL CARDS) MISSION/AREA A (ALL CARDS) RUN NUMBER 00000 (ALL CARDS)

FISCAL YEAR: N = 1963

MATERIEL NAME	CODE	FORMAT	
	00001	F	TERRIER MISSILE MT-3

YEARLY DATA

		FISCAL YEAR										
YEARLY AVERAGE UNIT COST	00011 3	N-1 00701	N 00682	N+1 00675	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10

NO-YEAR DATA

DELIVERIES TO T.O.A. INDEX	00035 T	00860
PROCUREMENT APPROPRIATION INDEX	00051 T	00455

III D

MILITARY PERSONNEL DATA

III D -C16-

MILITARY PERSONNEL TYPE, NUMBER 42040 (ALL CARDS)

RUN NUMBER 000000 (ALL CARDS)

PAGE 1 OF 1

FISCAL YEAR: N = 1963

MILITARY PERSONNEL TYPE, NAME	MISSION/AREA	CODE	FORMAT
		00001	F

ENLISTED - ETHEA (NAVY)

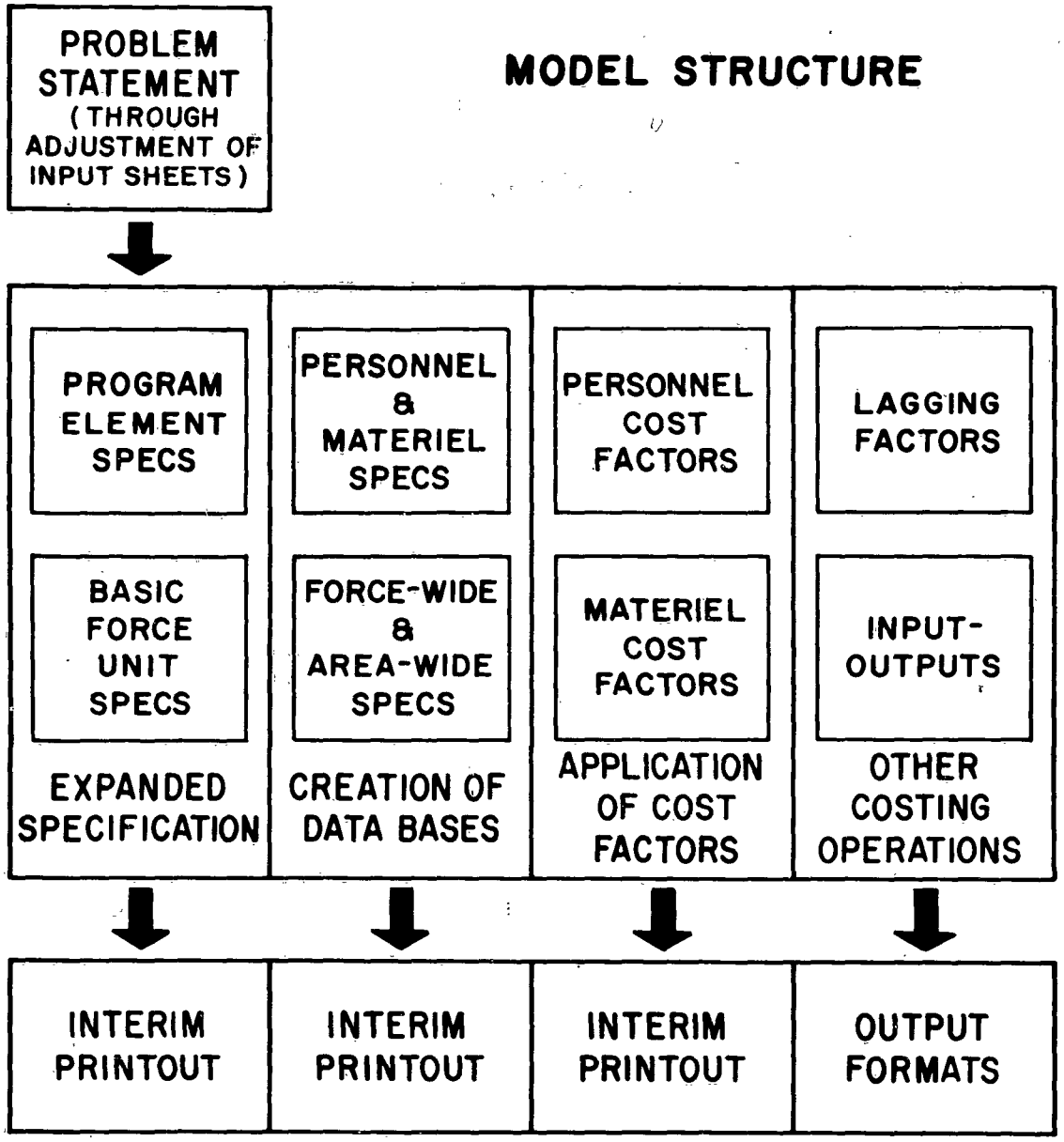
MISSION / AREA NAME		ITEM NAME		CODE		FISCAL YEAR N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
WORLD WIDE	YEARLY DATA			A													
	NO-YEAR DATA	PAY & ALLOWANCES	$/Pm	00011	T	0360											
		TURNOVER RATE		00012	S	0015											
		NEW PERSONNEL TRAINING COST	$/Pm	00013	T	0300											
		UNSPEC. MAT'L ITEMS PAMN - A/C	$/Pm	00015	T												
		UNSPEC. MAT'L ITEMS PAMN-MIS'L	$/Pm	00016	T												
		UNSPEC. MATERIEL ITEMS SCN	$/Pm	00017	T												
		UNSPEC. MATERIEL ITEMS OPN	$/Pm	00018	T	0060											
		UNSPEC. MATERIEL ITEMS PMC	$/Pm	00019	T												
				A													
	YEARLY DATA			T													
	NO-YEAR DATA	PAY & ALLOWANCES	$/Pm	00011	T												
		TURNOVER RATE		00012	S												
		UNSPEC. MAT'L ITEMS PAMN-A/C	$/Pm	00015	T												
		UNSPEC. MAT'L ITEMS PAMN-MIS'L	$/Pm	00016	T												
		UNSPEC. MATERIEL ITEMS SCN	$/Pm	00017	T												
		UNSPEC. MATERIEL ITEMS OPN	$/Pm	00018	T												
		UNSPEC. MATERIEL ITEMS PMC	$/Pm	00019	T												
	YEARLY DATA			T													
	NO-YEAR DATA	PAY & ALLOWANCES	$/Pm	00011	T												
		TURNOVER RATE		00012	S												
		UNSPEC. MAT'L ITEMS PAMN-A/C	$/Pm	00015	T												
		UNSPEC. MAT'L ITEMS PAMN-MIS'L	$/Pm	00016	T												
		UNSPEC. MATERIEL ITEMS SCN	$/Pm	00017	T												
		UNSPEC. MATERIEL ITEMS OPN	$/Pm	00018	T												
		UNSPEC. MATERIEL ITEMS PMC	$/Pm	00019	T												

MODEL STRUCTURE: OTHER COSTING OPERATIONS

In addition to the kinds of inputs thus far described, there are additional costing operations (C18), including application of relationships which are on a total Navy or Marine Corps basis regardless of unit or equipment. Some examples are shown here (C19, C20). These relationships will include the allocation of total training costs to their component appropriation categories and combat support stockage factors for equipment items. Cost coefficients designed to allocate the costs of unspecified materiel are entered by appropriation category on these sheets. Operations and maintenance cost factors calculated on a dollars per military man basis, such as medical care, will also be entered here.

Thus far we have developed net asset requirements independent of the year in which the TOA is required. We handle this phasing by coding each item of equipment on the earlier formats to this look-up table (C21) which contains various likely time relationships between the time when delivery of the item is required and when obligational authority is needed. The first line indicates an item required in year N, which typically has 100% of its authority granted five years before year N. Our analyses indicate that there are about 40 patterns of this nature.

MODEL STRUCTURE



WORLD WIDE DATA

NUMBER 0 0 0 0 1 (ALL CARDS) MISSION / AREA A (ALL CARDS) RUN NUMBER 0 0 0 0 0 0 (ALL CARDS)

PAGE 1 OF 1

FISCAL YEAR: N= 1763

YEARLY DATA	CODE	FORMAT	FISCAL YEAR N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
EQUIP COMBAT SUPPORT STOCK LEVEL ADJUSTMENT FACTOR	00041	1												
RELATED EQUIPMENT STOCK LEVEL ADJUSTMENT FACTOR	00053	1												
UNSPECIFIED MATERIEL COST COEFFICIENT-AIRCRAFT NAVY	00065	5	00050											
UNSPECIFIED MATERIEL COST COEFFICIENT-MISSILE NAVY	00077	5	00060											
UNSPECIFIED MATERIEL COST COEFFICIENT-SCN	00089	5												
UNSPECIFIED MATERIEL COST COEFFICIENT-OPN	00101	5	02500											
UNSPECIFIED MATERIEL COST COEFFICIENT-PMC	00113	5	03400											

NO-YEAR DATA	CODE	FORMAT	
RUN NAME	00001	F	WAVY SAMPLE RUN
TRANSFER TRANSPORTATION COST COEFFICIENT	00012	S	
SECOND DESTINATION TRANSP COST COEFFICIENT	00026	S	
DAYS OF COMBAT SUPPORT STOCKS, EQUIPMENT	00027	U	
DAYS OF COMBAT SUPPORT STOCKS, RELATED EQUIPMENT	00028	U	
TRAINING COST APPROPRIATION ALLOC. RATE-MIL PERSNL NAVY	00013	S	
TRAINING COST APPROP. ALLOC. RATE-MIL. PERSNL. MARINES	00014	S	
TRAINING COST APPROP. ALLOC. RATE-MIL. CONSTRUCTION NAVY	00015	S	
TRAINING COST APPROPRIATION ALLOC. RATE-O & M NAVY	00016	S	
TRAINING COST APPROPRIATION ALLOC. RATE-O & M MARINES	00017	S	
TRAINING COST APPROP. ALLOC. RATE-AIRCRAFT NAVY	00018	S	
TRAINING COST APPROP. ALLOC. RATE-MISSILES NAVY	00019	S	
TRAINING COST APPROPRIATION ALLOC. RATE-OPN	00020	S	
TRAINING COST APPROPRIATION ALLOC. RATE-PMC	00021	S	
O & M NAVY-CIVIL ENGINEERING $/P$_m$	00031	T	
O & M NAVY-MEDICAL CARE $/P$_m$	00032	T	
O & M MARINE CORPS $/P$_m$	00033	T	

MISSION / AREA DATA

NUMBER 00001 (ALL CARDS) MISSION / AREA B (ALL CARDS) RUN NUMBER 000000 (ALL CARDS)

FISCAL YEAR: N= 1963

MISSION / AREA NAME NAVY

YEARLY DATA	CODE	FORMAT	N-1	N	N+1	N+2	N+3	N+4	N+5	N+6	N+7	N+8	N+9	N+10
			FISCAL YEAR											
EQUIP. COMBAT SUPPORT STOCK LEVEL ADJUST. FACTOR	00041	1												
RELATED EQUIPMENT STOCK LEVEL ADJUST. FACTOR	00053	1												

NO-YEAR DATA		CODE	FORMAT	
SECOND DESTINATION TRANSP. COST COEFFICIENT		00026	S	
DAYS OF COMBAT SUPPORT STOCKS, EQUIPMENT		00027	U	0100 0
DAYS OF COMBAT SUPPORT STOCKS, RELATED EQUIPMENT		00028	U	0100 0
TRAINING COST APPROPRIATION ALLOC. RATE-MIL. PERSNL. NAVY		00013	S	0655 0
TRAINING COST APPROP. ALLOC. RATE-MIL. PERSNL. MARINES		00014	S	
TRAINING COST APPROP. ALLOC. RATE-MIL. CONSTRUCTION NAVY		00015	S	0063 0
TRAINING COST APPROPRIATION ALLOC. RATE-O & M NAVY		00016	S	0230 0
TRAINING COST APPROPRIATION ALLOC. RATE-O & M MARINES		00017	S	
TRAINING COST APPROP. ALLOC. RATE-AIRCRAFT NAVY		00018	S	0071 0
TRAINING COST APPROP. ALLOC. RATE-MISSILES NAVY		00019	S	0010 0
TRAINING COST APPROPRIATION ALLOC. RATE-OPN		00020	S	0025 0
TRAINING COST APPROPRIATION ALLOC. RATE-PMC		00021	S	
O & M NAVY-CIVIL ENGINEERING	$/P$_m$	00031	T	0150 0
O & M NAVY-MEDICAL CARE	$/P$_m$	00032	T	0050 0
O & M MARINE CORPS	$/P$_m$	00033	T	

IVC

DELIVERIES TO T.O.A. SCHEDULES

IVC

NUMBER 00001 ALL CARDS

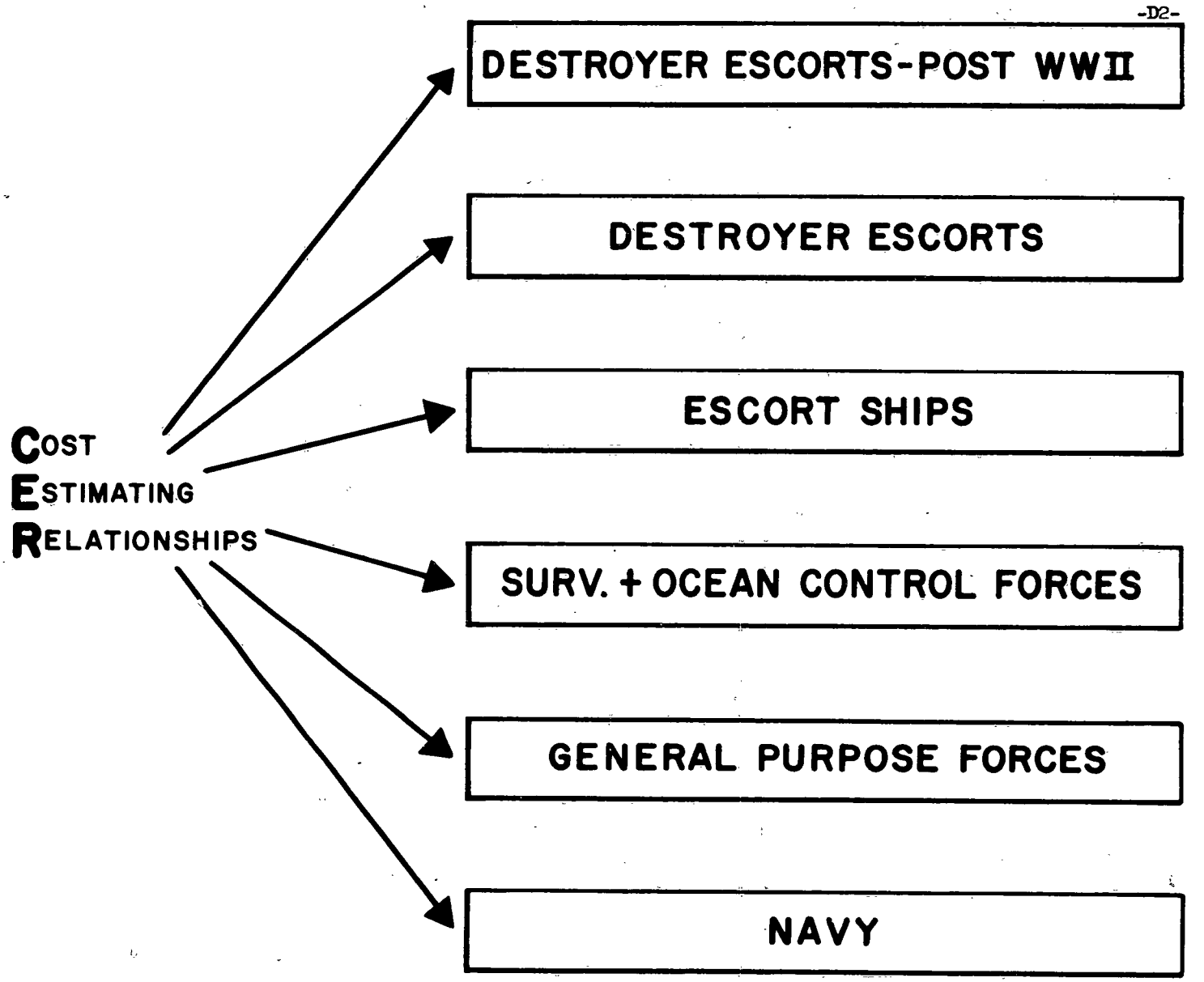
MISSION/AREA A ALL CARDS

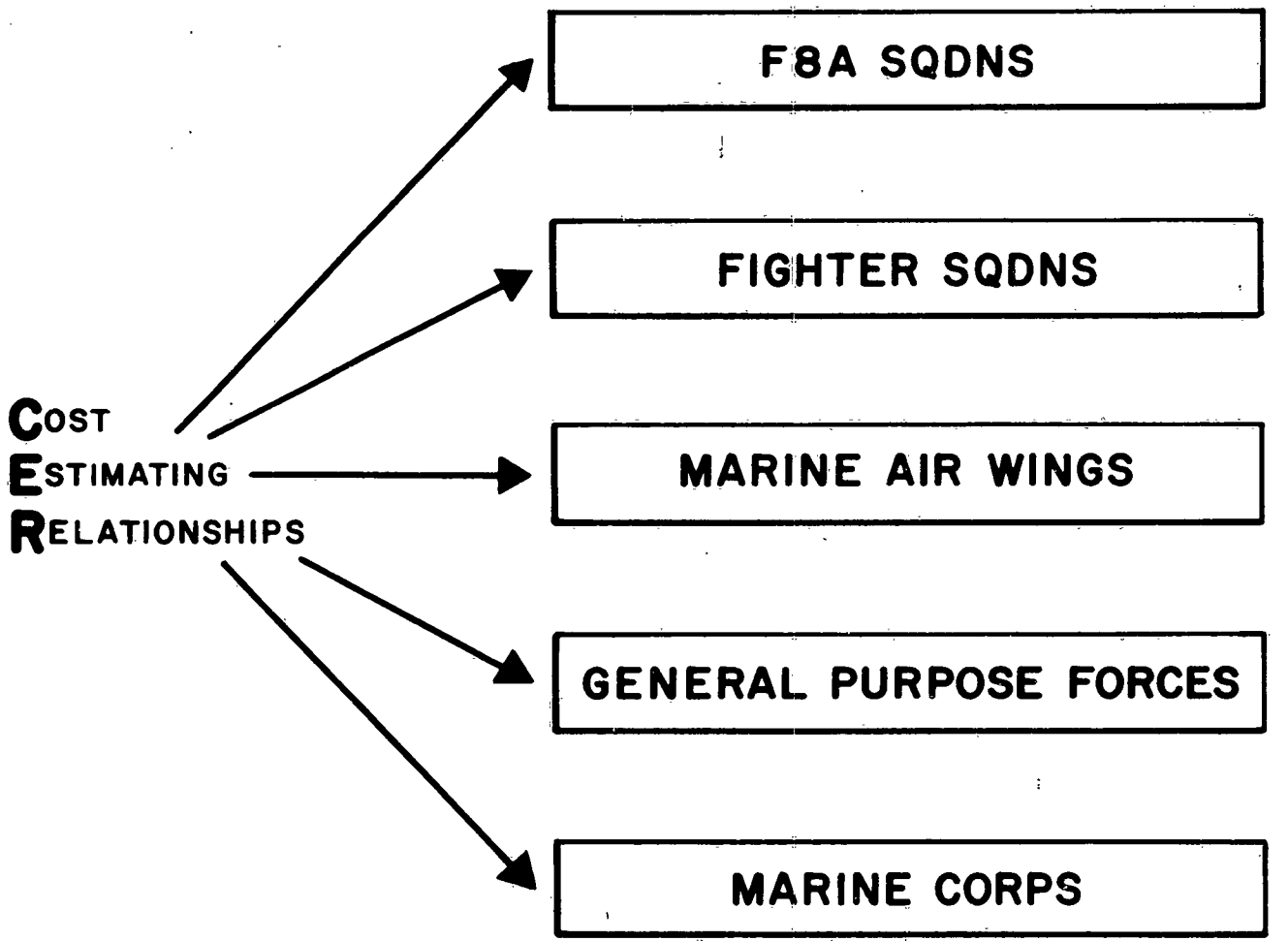
RUN NUMBER 000000 ALL CARDS

INDEX CODE	FORMAT	% OF DELIVERIES IN YEAR N CONTRIBUTING TO T O A. IN YEAR						
		N-6	N-5	N-4	N-3	N-2	N-1	N
00720	7		10000					
00727	1			10000				
00734				6500		3500		
00741				5000	5000			
00748				5000	3500	1500		
00755				4000	4500	1500		
00762				3000	7000			
00769				2000	8000			
00776				1000	7000	2000		
00783				0500	3500	6000		
00790					10000			
00797					6000	4000		
00804					5000	5000		
00811					2500	7500		
00818					2000	8000		
00825					0500	7500	2000	
00832					0500	2000	7500	
00839						10000		
00846						8000	2000	
00853						7500	2500	
00860						7000	3000	
00867						6500	3500	
00874						6000	4000	
00881						5500	4500	
00888						5000	5000	
00895						4500	5500	
00902						4000	6000	
00909						3500	6500	
00916						3000	7000	
00923						3000	5500	1500
00930						2500	7500	
00937						2500	5000	2500
00944						2000	8000	
00951						1500	8500	
00958						1000	9000	
00965						0500	8500	1000
00972							10000	
00979							7500	2500
00986	1						5500	4500
00993	7							10000

MODEL CONCEPTS: COST ESTIMATING RELATIONSHIPS

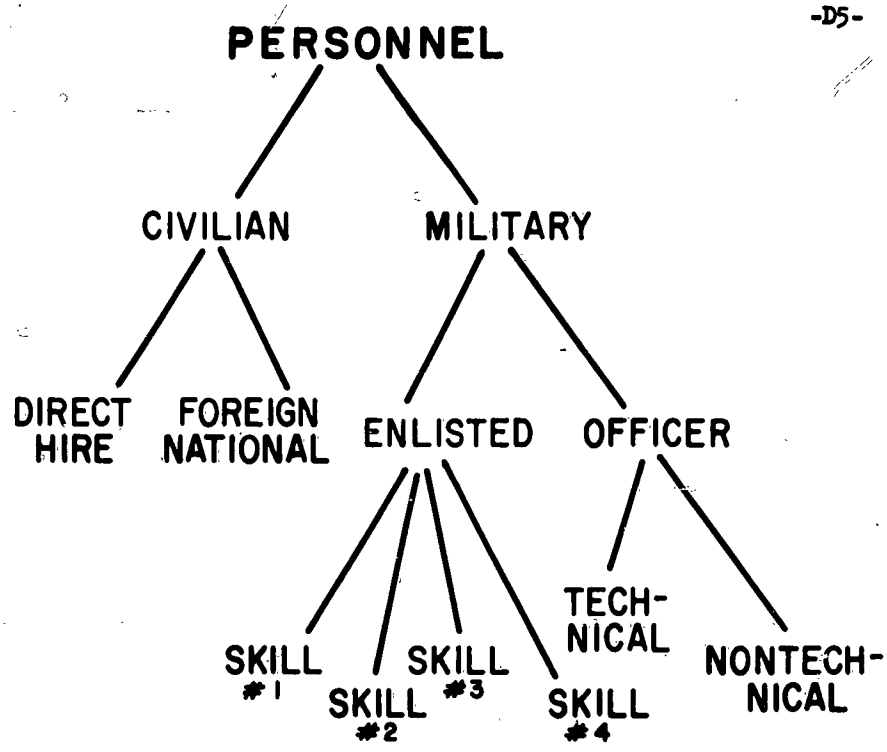
The Navy cost model was designed for maximum flexibility. The next two charts (D2, D3) illustrate the levels at which cost estimating relationships can be entered in the model. The nature of the data, as well as its form and availability, will determine the level at which cost estimating relationships will be entered. For example, Medicare costs per military man may be entered at the most aggregative level, total Navy (and total Marine Corps) while fuel cost estimating relationships may be entered at the lowest level of aggregation, Destroyer Escorts - Post WW II (and F8A Squadrons).

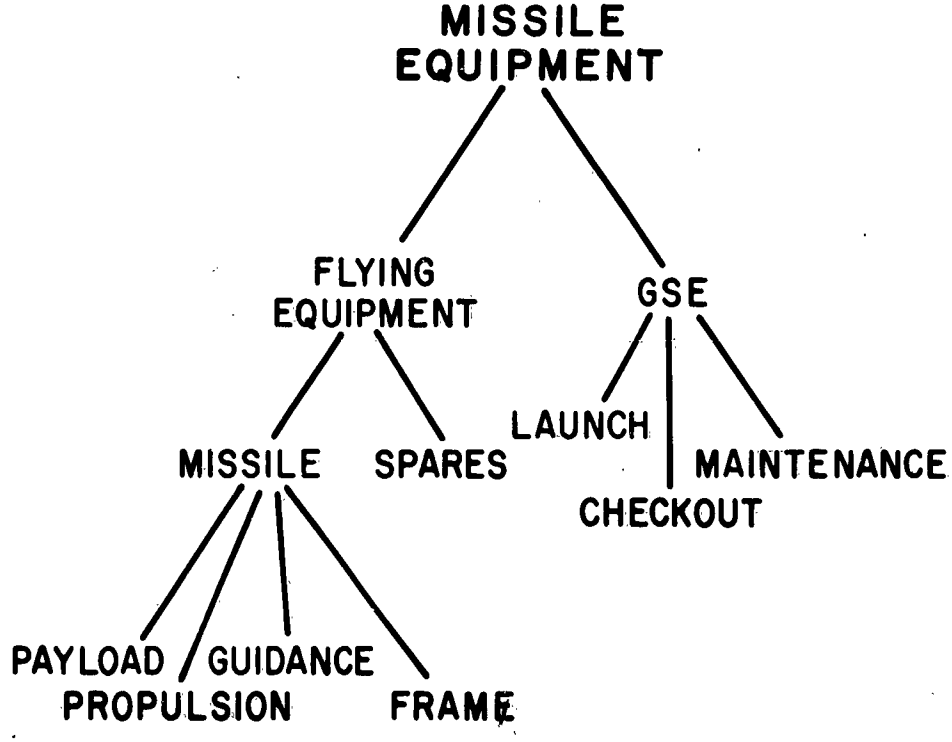

DESTROYER ESCORTS-POST WWII
DESTROYER ESCORTS
ESCORT SHIPS
COST
ESTIMATING
RELATIONSHIPS
SURV. + OCEAN CONTROL FORCES
GENERAL PURPOSE FORCES
NAVY


COST
ESTIMATING
RELATIONSHIPS
F8A SQDNS
FIGHTER SQDNS
MARINE AIR WINGS
GENERAL PURPOSE FORCES
MARINE CORPS

MODEL CONCEPTS: BRANCHING

The model has been designed to be open-ended; that is, it can accept various levels of information (D5). The levels which are introduced into the model calculations are a function of data and the problem on hand. For example, we would want to have personnel for the Polaris MFU's identified by skills because their training costs are significantly higher than for the average Navy military man. For other force units, such as destroyer escorts, identification at the enlisted/officer level might suffice. Branching can also take place in other areas of the model such as in the treatment of equipment. An item of equipment could be a GSE set (D5). On the other hand, if it were necessary, the set could be broken out into its important components and each of the components treated as an individual item of equipment. The detailing of component GSE equipment for one missile would not require the same treatment for all other missiles since the model can accept various levels of detail for different equipment items and force units. This flexibility is desirable since the analyst can choose the level of detail to be used in each instance in accordance with the availability and significance of the input information.

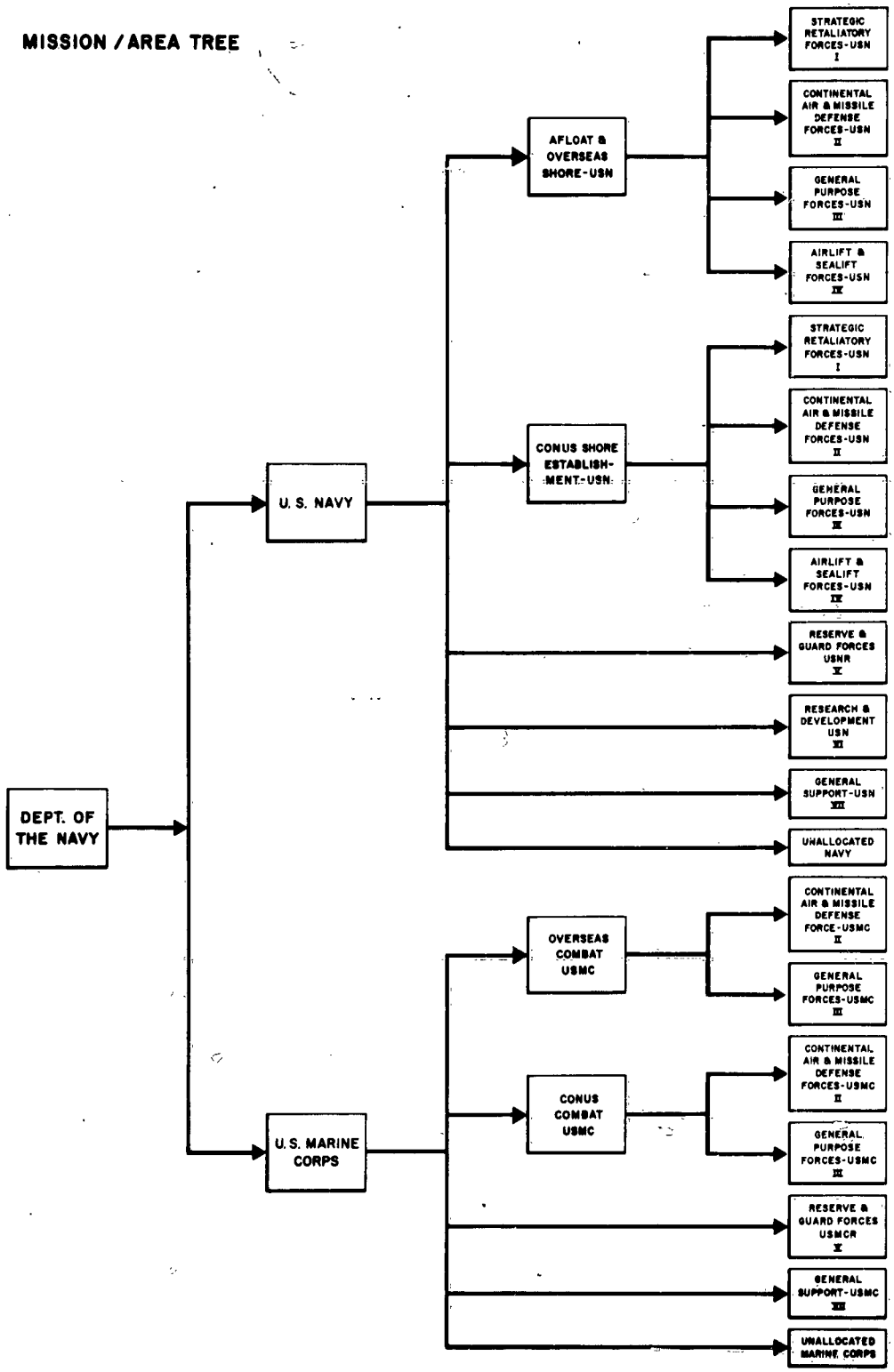

PERSONNEL
CIVILIAN
MILITARY
DIRECT HIRE
FOREIGN NATIONAL
ENLISTED
OFFICER
SKILL #1
SKILL #2
SKILL #3
SKILL #4
TECH-NICAL
NONTECH-NICAL


MISSILE EQUIPMENT
FLYING EQUIPMENT
GSE
MISSILE
SPARES
LAUNCH
CHECKOUT
MAINTENANCE
PAYLOAD
PROPULSION
GUIDANCE
FRAME

MODEL CONCEPTS: MISSION AREA TREE

Mission/areas are an integral part of the Navy cost model structure. Mission/areas permit the differentiation between Navy forces and Marine forces; between CONUS shore establishments, forces afloat, and forces overseas; and between Programs I through VII. These are illustrated on the next chart (D7) which shows the mission/area tree. The model searches along the mission/area tree for input data, starting at the most disaggregative level. The amount of input data required can be decreased through the use of treeing. If the cost or allowance generating characteristics of a particular resource item or force unit were identical in different mission/areas a separate input sheet for each mission/area would not be required. Other mission areas, such as geographical breaks or task force organizations, can be added as required.

MISSION / AREA TREE



SUGGESTIONS FOR NAVY COST MODEL RESEARCH

We have developed statements of tasks to be accomplished in order to carry out the Navy cost model development. The five charts (E2-6) outline the areas of research. Part 1 of the outline (E2) is devoted to the scope of the model. Part 2 (E3) of the outline deals with the specification of the base case. Part 3 (E4, E5) is concerned with the actual development of cost estimating relationships and data gathering. Part 4 (E6) indicates the work to be done in computer program development.

Suggested Outline for Navy Cost Model Research - 1

1. Definition of Output Requirements

1.1 MFU/BFU Selection

1.2 Cost Categories and Budget Codes

1.3 Materiel Annex Items

1.4 Force Dimensions

1.5 Personnel Types

1.6 Ten Year Time Span - (12 Year Input)

1.7 Type of Cost - TOA

1.8 Rounding - Dollars in Tenths of Millions

- Personnel in Units

1.9 Non-Add Entries

Suggested Outline for Navy Cost Model Research - 2

2. Specification of Base Case

- 2.1 Selection of Base Case
- 2.2 Specification of Force Structure
- 2.3 Specification of Materiel Requirements
  - 2.3.1 Initial Allowances
  - 2.3.2 Stocks
  - 2.3.3 Attrition/Consumption
- 2.4 Specification of Related Materiel
  - 2.4.1 Stocks
  - 2.4.2 Attrition/Consumption
- 2.5 Specification of Personnel Types

Suggested Outline for Navy Cost Model Research - 3

3. Development of Cost Estimating Relationships and Related Data Support

3.1 Utilization of Existing Relationships

3.2 Materiel Data

3.2.1 Application of Phasing Schedules

3.2.2 Unit and Progress Curve Costs

3.2.3 Conversion and Modification

3.2.4 Related Fuel Consumption

3.2.5 Overhaul

3.2.6 Lag Factors

3.2.7 Activity Rates

3.2.8 Logistics Policy - Days of Supply

3.2.9 Residual Materiel Relationships

Suggested Outline for Navy Cost Model Research - 3 (Cont.)

3.3 Personnel Data

- 3.3.1 Training Cost by Personnel Type and by Appropriation
- 3.3.2 Turnover by Type
- 3.3.3 Lag Factors
- 3.3.4 Pay and Allowances by Type
- 3.3.5 Support and Unspecified Personnel Relationships
- 3.3.6 Thruputs

3.4 Other Data

- 3.4.1 Miscellaneous Supplies and Services Relationships e.g., Medical Services, M&O of Shore Establishment
- 3.4.2 Thruputs e.g., RDT&E, Construction

Suggested Outline for Navy Cost Model Research - 4

4. Development of Computer Program

4.1 Modification of Codes

4.2 Specify Input Formats

4.3 Development of Navy Dictionary

4.4 Revision of Input Procedures

4.5 Modification of Calculating Procedures

4.6 Lay Out Output Report Form and Modify Printouts

4.7 Check Out and Test Runs

PROJECT STATEMENTS

The following section (E8-39) consists of a series of research project statements for the development of a Navy cost model. The estimates of time and manpower requirements are tentative at best. Therefore, they should be considered as order of magnitude estimates only. In order to properly assess the effort develoted to any one project, the interdependence of the projects and the contributions of initial projects to later projects must be recognized.

1.0 Definition of Output Requirements

OBJECTIVE: To define and indicate the contents of the model outputs.

APPROACH: Selection of appropriate MFU/BFU lists and cost categories should be accomplished in the early phases of the research program. Tentative lists of these have been drawn up to serve as a basis for future discussions. Basic to such discussions will be the dimensions of the force. For ship units the dimension will probably be ships of a particular type - e.g., CVA, Midway Class. Further exploration will be required to determine whether the dimensions of the aircraft units should be in terms of squadrons of a given model or in terms of numbers of aircraft of a given model in the force or both. A sample Materiel Annex list has been made; its contents will be revised as required. The reasonableness and usefulness of the personnel types to be included in the model will have to be established in collaboration with Navy personnel specialists.

In order to have a model output covering a ten-year time span twelve years' inputs are required because of inventory and lagging. All costs will be given in terms of Total Obligational Authority and will be rounded to tenths of millions of dollars. Personnel numbers will not be rounded but will be given in units. The exact treatment of Non-add Elements will need to be determined.

PERSONNEL REQUIREMENTS: 6

3 Service 3 Contractor

TIME REQUIREMENT: One Week

2.1 Selection of Base Case

OBJECTIVE: To select the most meaningful and useful base case.

APPROACH: Discussions will be held with Navy personnel to assist in the selection of base case - i.e., the Navy Program Submission to be used as a starting point in the development of model inputs. The main considerations will be the availability of data and the timeliness and usefulness of the outputs.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: One-half Week

2.2 Specification of Force Structure

OBJECTIVE: To specify the force structure for the base case.

APPROACH: Once the base case has been selected, work on the specification of the force structure can begin. The force structure will be essentially a time-phased display of the numbers of basic force units. Much of the information required to specify the force structure is readily available in the Program Submissions. However, some ambiguities exist in the Program Element force structures. In other cases, sufficient detail for costing purposes is lacking. Aircraft units are likely to be the most troublesome area. Navy planning documents will be relied upon extensively but many problems will be resolved by detailed discussions with the Navy.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Two Weeks

2.3.1 Initial Allowances

OBJECTIVE: To review and update initial allowances for all specified materiel items.

APPROACH: The initial allowance of specified materiel items for each Basic Force Unit should be verified through contacts with Navy personnel. In addition, it will be necessary to specify allowances for those materiel items added in the January, 1963 Submission.

PERSONNEL REQUIREMENTS: 4

2 Service 2 Contractor

TIME REQUIREMENT: Two Weeks

2.3.2 Stocks

OBJECTIVE: To develop combat support and pipeline stock factors for each specified procurement item.

APPROACH: Determine Navy procedure used in developing combat support and pipeline for all specified materiel items. Ascertain the relationship between different combat activity rates such as sustaining and assault and the variance in pipeline between Atlantic and Pacific. Reduce different rates to a common factor for combat stocks and pipeline for each specified materiel item to conform to model procedures.

PERSONNEL REQUIREMENTS: 3

1 Service 2 Contractor

TIME REQUIREMENT: Two weeks

2.3.3 Attrition/Consumption

OBJECTIVE: To develop a set of attrition/consumption factors for each materiel item.

APPROACH: Determine appropriate relationships by which attrition/consumption factors should be applied to the materiel items, e.g., by average operating inventory, by flying hours, etc. Review and update, where applicable, aircraft attrition rates collected for all aircraft in the 1962 October Submissions. Obtain attrition/consumption factors for the other materiel items.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: One Week

2.4.1 Stocks

OBJECTIVE: To develop combat support and pipeline stock factors for each related procurement item.

APPROACH: Determine Navy procedure used in developing combat support and pipeline for all related materiel items, e.g., ammunition. Ascertain the relationship between different combat activity rates such as sustaining and assault and the variance in pipeline between Atlantic and Pacific. Reduce different rates to a common factor for combat stocks and pipeline for each specified materiel item to conform to model procedures.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: One Week

2.4.2 Attrition/Consumption

OBJECTIVE: To develop a set of attrition/consumption factors for each related materiel item.

APPROACH: Determine appropriate relationship by which attrition/consumption factors should be applied to the related materiel items, e.g., training ammunition. Obtain appropriate factors for each item.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: One Week

2.5 Specification of Personnel Types

OBJECTIVE: Determine personnel types associated with Naval and Marine Corps force units and develop estimating methodology to fulfill these personnel requirements.

APPROACH: Review Naval and Marine Corps personnel documents to determine force units' personnel requirements. Develop means of estimating the requirements including such personnel types as flight officers and enlisted personnel and other hazardous duty personnel types.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Three Weeks

3.1 Utilization of Existing Relationships

OBJECTIVE: To make the fullest possible use of existing cost estimating relationships.

APPROACH: Determine the extent to which Navy Bureaus and offices are presently using statistical procedures to estimate costs of personnel, equipment, and operations. In cooperation with the Navy adapt and modify those cost estimating relationships for model use wherever possible in order to effect time and manpower savings. Cooperation of other Navy contractors should be solicited.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Three Weeks

3.2.1 Application of Phasing Schedules

OBJECTIVE: For appropriate specified materiel items develop phasing schedules which will permit approximation of the procurement program and the mix of new items and substitutes as specified in the base case.

APPROACH: Determine those specified items which should be entered into the force through a phasing schedule and those which should be entered through a time-phased initial allowance. The criterion for this selection should be the number of different times a materiel item has to be specified. For those specified items which require a phasing schedule, ascertain whether this procedure can be computed without resorting to machine iteration. If this simplified approach isn't possible compute assets as a percent of requirements for each materiel item and iterate these figures through machine runs until the projected procurement program is matched.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Three Weeks

3.2.2 Unit and Progress Curve Costs

OBJECTIVE: To develop yearly average delivery unit costs for each materiel item.

APPROACH: Examine the funding of unit costs. Where constant unit costs are inappropriate, construct cost-quantity relationships to obtain time-phased unit costs which will be associated with each materiel item in the fiscal year of delivery. Investigate costs to insure that, where applicable, spares and first destination transportation costs are included.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Two Weeks

3.2.3 Conversion and Modification

OBJECTIVE: To determine the selected equipment specification by appropriation for ships that are being converted or undergoing FRAM and investigate the need for specifying modification costs for other major equipment such as aircraft.

APPROACH: Determine which ships are to undergo conversion, FRAM I and FRAM II, the equipment involved and the appropriations from which the equipment is funded; check specifications already made in this area with Navy personnel. Determine whether one set of selected equipment adequately specifies each ship-type for either a conversion or a FRAM program. Investigate the magnitude of the costs of modification for other major equipment with a view of determining whether these costs need to be uniquely determined. If the funds are sizeable, detail a procedure for computing yearly funding such as a percentage of the yearly procurement money.

PERSONNEL REQUIREMENTS: 3

1 Service 2 Contractor

TIME REQUIREMENT: Two Weeks

3.2.4.1 Non-Nuclear Fuel Consumption - Ships

OBJECTIVE: Develop a set of factors for generating costs of conventional fuel consumption by ships.

APPROACH: Assemble and analyze existing data on conventional fuel consumption and costs by ship - both annual and per steaming hour. Ascertain the feasibility of using an activity rate base for cost factors. Fill gaps with technical data on consumption rates and fuel costs. Identify what component of budget activities these costs comprise and quantitatively test factors against historical period.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Two Weeks

3.2.4.2 Nuclear Fuel Consumption

OBJECTIVE: Develop a set of factors for generating costs of nuclear fuel consumption by ship type.

APPROACH: Assemble and analyze existing data. Determine if there is a learning curve factor influencing nuclear fuel consumption rates and costs. Ascertain the feasibility of relating costs to activity rates with attention to measures of stationary time as well as time under way. Develop methods for extending known cost rates to new nuclear powered ships. Match cost factors to budget categories.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Three Weeks

3.2.4.3 POL Consumption - Aircraft

OBJECTIVE: Produce a set of POL cost factors by aircraft type.

APPROACH: Assemble and analyze existing data on aircraft POL costs - both on an annual and per flying hour basis. Ascertain feasibility of using a flying hour base for the cost factors. Identify information gaps and develop methods for filling by inference from known data. Relate information to appropriate budget categories. Determine feasibility for combining POL consumption costs with consumption of non-technical supplies.

PERSONNEL REQUIREMENTS: 1

1 Contractor

TIME REQUIREMENTS: Two Weeks

3.2.5.1 Overhaul of Ships

OBJECTIVE: Produce a set of overhaul cost factors by ship type and develop underlying methodology.

APPROACH: Assemble and analyze existing overhaul cost data by ship type including costs per overhaul, annual overhaul costs, and overhaul costs per steaming hour. Examine the feasibility and advisability of relating overhaul costs to activity rates (steaming hours) with attention to scheduled vs unscheduled overhaul and maintenance requirements. Determine coverage of these data - especially the part of Navy O&M major activity "Ships and Facilities" to which they relate. Identify statistical gaps and develop methods for filling them. Develop and apply methods for allocating closely related O&M costs, if any, which are not covered by existing data. Produce the set in such a way that it relates to Navy Basic Force and Major Force Units, to Programs, and to identifiable components of budget categories.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENTS: Four Weeks

3.2.5.2 Overhaul of Aircraft

OBJECTIVE: Produce a set of overhaul cost factors by aircraft type and develop underlying methodology.

APPROACH: Assemble and analyze existing overhaul cost data by aircraft type including costs per overhaul, annual overhaul costs, and costs per flying hour. Establish the extent to which such costs can and should be related to activity rates - both flying hours and sorties. Examine the usefulness of treating airframe and engine overhauls and consumption of technical supplies separately. Develop methodology for allocating indirect, but maintenance related, costs in O&M Weapons and Facilities category to direct costs. Identify information gaps and devise means of filling them. Produce the data set in such a way that it relates to appropriate Basic and Major Force Units, to Programs and to identifiable components of budget categories.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Five Weeks

3.2.5.3 Overhaul of Missiles

OBJECTIVE: Produce a set of overhaul costs by missile type and develop necessary methodology.

APPROACH: Investigate existing data and identify information gaps. Group missiles into meaningful categories for treatment with special attention to Polaris. Determine appropriate rate base such as number in force. Develop methodology for allocating relevant indirect O&M costs.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENTS: Two Weeks

3.2.6 Lag Factors

OBJECTIVE: Review and update existing delivery-funding relationships (Lag Factors).

APPROACH: Review and update lag pattern previously developed from the October 1962 Submissions. Develop lag patterns for materiel items added to the January 1963 Submissions. Test computer run using these factors against Navy appropriations and incorporate any necessary revisions.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Two Weeks

3.2.7 Activity Rates

OBJECTIVE: Develop activity rates for Naval and Marine Corps aircraft and ships.

APPROACH: Review Naval and Marine Corps documents pertaining to steaming hours and flying hours. Determine the extent to which activity rates are meaningful measures for cost estimating purposes. Develop activity rate factors for ships and aircraft as required.

PERSONNEL REQUIREMENTS:

1 Contractor

TIME REQUIREMENT: Two Weeks

3.2.8 Logistics Policy -- Days of Supply

OBJECTIVE: Specify the Days of Supply for each selected materiel item.

APPROACH: Investigate the implications of the recent shift of the Days of Supply to the "P Day" concept. Ascertain whether a "P Day" will have to be specified for each specified materiel item and, if so, whether the machine program will have to be modified. Determine whether variable combat consumption rates can be used in lieu of a floating "P Day."

PERSONNEL REQUIREMENTS: 4

2 Service 2 Contractor

TIME REQUIREMENT: Two Weeks

3.2.9 Residual Materiel Relationships

OBJECTIVE: To develop a procedure which will account for the costs of Navy materiel not specifically identified. To accomplish this it will be necessary to develop factors for two such "residual" requirements: 1) for specified materiel items to be delivered to non-specified force units and 2) for unspecified materiel items which will not be included in the total of the specified items or the "thruputs." These two residuals, when combined with the specified materiel items, will equal total procurement funding.

APPROACH: From a computer run of specified items determine which specified materiel items have a residual. For these develop the appropriate technique for model representation of this "residual" requirement: a factor based on the total residual related to the Basic Force Units, not related to the Basic Force Units, or a combination of both. In a like manner, develop the appropriate residual for the unspecified materiel using either a ratio of unspecified materiel to specified or a dollars-per-man factor or both.

PERSONNEL REQUIREMENTS: 3

1 Service 2 Contractor

TIME REQUIREMENT: Three Weeks

3.3.1 Training Cost by Personnel Type and by Appropriation

OBJECTIVE: To develop per man training cost factors by personnel type and by appropriation.

APPROACH: The Navy Submissions show all training costs in the training Elements in Program VII. In the Navy cost model being developed, training costs may be retained in Program VII or allocated to all major force units on the basis of military manpower and changes in the force structure. The allocation of training costs to units is the more useful approach for cost analysis purposes, particularly if differentiations can be made between personnel types. As a minimum, a training cost should be developed for each of the following personnel types:

Navy	Marine Corps
Officers -- Flight	Officers -- Flight
Officers -- Submarine	Officers -- Incentive
Officers -- Other	Officers -- Other
Enlisted -- Flight	Enlisted -- Flight
Enlisted -- Submarine	Enlisted -- Incentive
Enlisted -- Other	Enlisted -- Other

Data availability will determine whether differential training costs can be developed for personnel types other than those listed above.

Each training cost factor should be broken down into the following appropriation categories:

Military Personnel, Navy
Military Personnel, Marine Corps
Military Construction, Navy
Operations and Maintenance, Navy
Operations and Maintenance, Marine Corps
Shipbuilding and Conversion, Navy
Other Procurement, Navy
Procurement of Aircraft and Missiles, Navy
Procurement, Marine Corps

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Five Weeks

3.3.2 Turnover by Type

OBJECTIVE: To develop personnel turnover rates.

APPROACH: The usefulness of training cost factors by personnel type is greatly lessened if turnover rates are not also differentiated by the same personnel types. Therefore, it will be desirable to develop such turnover rates in conjunction with the development of training costs. As a minimum, turnover rates will be developed for the following personnel types:

Navy	Marine Corps
Officers -- Flight	Officers -- Flight
Officers -- Submarine	Officers -- Incentive
Officers -- Other	Officers -- Other
Enlisted -- Flight	Enlisted -- Flight
Enlisted -- Submarine	Enlisted -- Incentive
Enlisted -- Other	Enlisted -- Other

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: One Week

3.3.3 Lag Factors

OBJECTIVE: To develop lag factors for training costs.

APPROACH: Skill training of personnel must begin at some interval prior to the actual requirement for trained personnel. This training lead-time will vary with the length of training required. This lead-time must be investigated in order to develop lagging factors for training costs.

PERSONNEL REQUIREMENTS: 1

1 Contractor

TIME REQUIREMENT: One Week

3.3.4 Pay and Allowances by Type

OBJECTIVE: To develop pay and allowance factors by personnel types and appropriation.

APPROACH: Develop per man pay and allowance factors for each cost sensitive personnel type. Factors should be developed for each of the following categories:

Navy	Marine Corps
Officers -- Flight	Officers -- Flight
Officers -- Submarine	Officers -- Incentive
Officers -- Other	Officers -- Other
Enlisted -- Flight	Enlisted -- Flight
Enlisted -- Submarine	Enlisted -- Incentive
Enlisted -- Other	Enlisted -- Other

Pay and allowance factors will be keyed to the following appropriations:

Military Personnel, Navy
Reserve Personnel, Navy
Military Personnel, Marine Corps
Reserve Personnel, Marine Corps

PERSONNEL REQUIREMENTS: 1

1 Contractor

TIME REQUIREMENT: One Week

3.3.5 Support and Unspecified Personnel Relationships

OBJECTIVE: To develop methods for allocating support and unspecified personnel.

APPROACH: Personnel in Programs V, VI, and VII will be treated as thruputs and a large part of the personnel in Programs I - IV will be associated with combat units. A means of estimating the remaining personnel in Programs I - IV will be developed. These personnel, largely comprising the support and overhead areas, may be estimated on the basis of ratios to combat personnel or by other means.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Two Weeks

3.4.1 Miscellaneous Supplies and Services Relationships, e.g., Medical Services, M & O of Shore Establishment.

OBJECTIVE: Develop cost factors for miscellaneous Naval and Marine Corps appropriations such as Medical Services, M & O of Shore Establishment.

APPROACH: Review Naval and Marine Corps documents pertaining to miscellaneous appropriations which are definitely related to military manpower or programs and develop dollars per man or unit factors to handle their costs.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Four Weeks

3.4.2 Thruputs e.g., RDT&E, Construction

OBJECTIVE: Determination of those Naval and Marine Corps appropriations which should be handled by the thruput or direct input method in the Navy cost model.

APPROACH: Review Navy Program Submissions and other documents to ascertain those Naval and Marine Corps appropriations which are not influenced by force structure changes, and whose costs are relatively small and erratic e.g., RDT&E and Construction.

PERSONNEL REQUIREMENTS: 2

1 Service 1 Contractor

TIME REQUIREMENT: Three Weeks

4.0 Development of Computer Program

OBJECTIVE: To adapt the Army cost model computer program to the Navy cost model.

APPROACH: During the development of the Army cost model the intent was to generalize the program so as to make it readily adaptable to other service use. Thus major portions of the computer programming, procedures and formats can be applied to the Navy cost model with slight modifications. Model codes, the Navy dictionary, and, of course, the check out and test runs will be completely new work. Modifications will be made in the input formats, input procedures, calculating procedures, and in the output formats.

PERSONNEL REQUIREMENTS: 4

1 Service 3 Contractor

TIME REQUIREMENT: Eight Weeks